

ARGUMENT

Request for Continued Examination:

An RCE has been filed herewith.

Request for Personal Interview:

A personal interview with the Examiner is respectfully requested. Applicants' representative will contact the Examiner to set a mutually convenient date and time.

Regarding the Claims in General:

Claims 1-13 remain pending, non-elected claims 14-23 having previously been canceled without prejudice to presentation in a divisional application.

Claim 1 has been amended to more clearly highlight in explicitly structural terms, features of the invention which distinguish it from the cited references.

Regarding the Prior Art Rejections:

Claims 1, 2, 12, and 13 stand rejected as being anticipated by Namerikawa U.S. Patent 6,523,423 (Namerikawa '423), and claims 1-4, 12 and 13 stand rejected as being anticipated by Namerikawa U.S. Patent 6,347,555 (Namerikawa '555). In addition, claims 1-5 and 8-13 stand rejected as being unpatentable over Sato U.S. Patent 5,985,064 (Sato) in view of either Namerikawa '423 or Namerikawa '555, and claims 1-7 and 12-13 stand rejected as being unpatentable over Mizutani Japanese Published Application JP 2000-369072 (Mizutani) in view of either Namerikawa '423 or Namerikawa '555. Applicants respectfully request reconsideration and withdrawal of these rejections in view of the amendments to claim 1 made herein.

The Examiner contends (see Section 9, second paragraph of the Office Action) that the claims as previously presented did not recite *structural differences* from the prior art. While applicants do not concur in the Examiner's statement that claim 1 did not recite structural limitations, this claim has been amended to avoid any reasonable argument to this effect.

Claim 1 is directed to an apparatus for aligning a bonding tool which comprises:

a force sensor configured to measure a force generated by the bonding tool on the force sensor,

wherein the force sensor comprises a plurality of force sensing sections that are isolated from each other such that each sensing section is operative to individually detect only the force from a part of the bonding tool acting directly on that sensing section,

the apparatus being responsive to differences between the individually detected forces to generate an alignment signal representing departure of the orientation of the bonding tool from the desired alignment.

None of the references, whether considered alone or in combination, disclose, teach or suggest a force sensor having “a plurality of force sensing sections that are isolated from each other such that each sensing section is operative to individually detect only the force . . . acting directly on that sensing section”, nor are the reference devices “responsive to differences between the individually detected forces to generate an alignment signal”.

In both of the Namerikawa patents, there are multiple force sensing sections mounted on a flexible plate. An operating member suspended on the flexible plate responds to a force to bend the plate, and the resulting stress on the plate is transmitted to the sensors. For example, in Namerikawa ‘423, sensors 6 are mounted on flexible plate 5a which has operating member 2 suspended from it (see Figs. 1a-1c).

This is not at all like what is recited in claim 1. For one thing, with the sensors directly mounted on the plate, the forces to be measured are transmitted to the sensors through the plate. Thus, forces resulting from contact with respective parts of a bonding tool do not act on individual sensing sections. Moreover, when flexible plate 5a bends due to movement of operating member 2, all of the sensor sections experience stress. This arrangement must inherently transmit stress to all the sensor sections irrespective of the vector direction of the force to be measured.

For either of the Namerikawa devices to detect force acting only directly on one of the sensing elements, the flexible plate would have to be eliminated completely. But then, what would the sensing elements be mounted on?

As to generation of a misalignment signal, the Namerikawa patents do disclose separately processing the sensor outputs, but there no disclosure, teaching or suggestion to generate a difference

signal which represents misalignment from a desired orientation of the vector direction of the force being measured. These references are just concerned with measuring the force in one, two or three directions (see Namerikawa '423, column 3, lines 55-62).

Neither Sato nor Mizutani remedies this basic deficiency in the Namerikawa patents. Sato is concerned only with controlling the downward movement of the bonding tool to apply a desired bonding force between a chip or die to be bonded and the bonding surface (see col. 1, lines 43-49). From the description at column 3, line 65 through column 4, line 30, it is apparent that there is no disclosure, teaching or suggestion of a sensor having multiple sensing sections, and in any event, Sato is not concerned with alignment of a bonding tool, or any other device.

Nor is there validity to the Examiner's suggested motivation for modifying Sato according to the Namerikawa patents. For one thing, none of the references is concerned with generating a signal representing misalignment of a bond head, or any other force-applying device.

Also, as explained above, combining the teachings of Sato and the Namerikawa patents would not yield sensor elements that are isolated from each other such that each element detects only the force acting directly on it, as required by claim 1.

In any event, it is not apparent that the operation of Sato's bonding head would be improved by a multiple element sensor mounted on a flexible supporting plate, even if such a combination structure could be said to meet the terms of claim 1.

Mizutani is concerned with height calibration to control vertical movement of a chip holder 27. This is to ensure that a chip 26 is placed precisely on a "diamond touch side 22a" of a package body 22 without risk of breakage of the chip corners. As in Sato, there is no concern about vertical misalignment of the bonding tool (see paragraphs [0022] and [0024]), and likewise, load cell 25 only needs to be responsive to vertical forces. In any event, there is no disclosure, teaching or suggestion that load cell 25 be comprised on multiple sensing elements, or that it produce an output signal which is representative of vertical misalignment of the bonding head.

Moreover, there is no legitimate basis for combining the teachings of Mizutani with either of the Namerikawa patents, again for the reasons discussed above in connection with Sato.

Conclusion:

In view of the foregoing, favorable reconsideration and allowance of this application are respectfully solicited.

EXPRESS MAIL CERTIFICATE

I hereby certify that this correspondence is being deposited with the United States Postal Service as Express Mail to Addressee (mail label #EV 342542703US) in an envelope addressed to: Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on June 19, 2006:

Dorothy Jenkins

Name of Person Mailing Correspondence

Dorothy Jenkins

Signature

June 19, 2006

Date of Signature

LAH:lac

Respectfully submitted,

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